



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,281 -	06/30/2003	Brian Taggart	884.853US1	5797

7590 12/28/2004

Schwegman, Lundberg, Woessner & Kluth, P.A.
P.O. Box 2938
Minneapolis, MN 55402

EXAMINER

NORRIS, JEREMY C

ART UNIT	PAPER NUMBER
----------	--------------

2841

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,281

Applicant(s)

TAGGART ET AL

Examiner

Jeremy C. Norris

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

The drawings are objected to because the sectional views are not properly crosshatched (see MPEP 608.02). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly

Art Unit: 2841

those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because of the sentence "A wire-bonding substrate is disclosed". Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2841

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-9, 11, 12, and 14-28 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,784,376 (hereafter Huemoeller).

Huemoeller discloses, referring to figures 2A-3, an article comprising: a wire-bonding mounting substrate including a first surface and a second surface; a first wire-bond pad (22B) disposed upon the first surface; and a first via (23) in the wire-bonding mounting substrate, wherein the first via is in electrical contact with the first wire-bond pad, and wherein the first via is disposed directly below the first wire-bond pad (fig. 3) [claim 1], wherein the via includes a liner (22A) that is electrically conductive [claim 3], further including an interconnect filling the via [claim 4] wherein the via includes a liner (22A), further an interconnect filling the via [claim 5], wherein the wire-bond pad includes a first layer and a second layer (22, 23), wherein at least one of the first layer and the second layer is selected from a precious metal, a precious metal alloy, silver, gold, platinum, nickel, palladium, platinum, cobalt, rhodium, iridium, and combinations thereof (col. 3, lines 10-25), wherein the wire-bond pad includes a first layer and second layer, and wherein the second layer is one of identical material to the first layer, or at least one of a more noble or a softer metal than the first layer (col. 2, line 60 – col. 3, line 10) [claim 7]

Additionally, Huemoeller discloses, a package comprising: a wire-bonding mounting substrate (20) including a first surface and a second surface; a first wire-bond

Art Unit: 2841

pad (22A) disposed upon the first surface; a first via (23A) in the wire-bonding mounting substrate, wherein the first via is in electrical contact with the first wire-bond pad, and wherein the first via is disposed directly below the first wire-bond pad (fig. 3); a die (31) disposed on the first surface and a first wire bond (34) that couples the die to the first wire-bond pad [claim 8], further including a second wire-bond pad disposed upon the first surface a second via in the wire-bonding mounting substrate, wherein the second via is in electrical contact with the second wire-bond pad, and wherein the second via is disposed directly below the second wire-bond pad (not shown, referred to, col. 3, 10-25) [claim 9], further including: a first bump (36) coupled to the first via [claim 11], further including: a first bump (36) coupled to the first via; and a first trace that makes an electrical contact to the first bump (not shown but discussed, col. 3, lines 55-65) [claim 12], wherein the first wire-bond pad is part of a plurality of wire-bond pads, and wherein each wire-bond pad is directly above a corresponding via from a plurality of vias (col. 3, lines 10-25) [claim 14], wherein the first wire-bond pad is part of a plurality of wire-bond pads, wherein each wire-bond pad is directly above a corresponding via from a plurality of vias, and wherein each via is coupled to a bump (36, see col. 3, 10-25) [claim 15], wherein the first wire-bond pad is part of a plurality of wire-bond pads, wherein each wire-bond pad is directly above a corresponding via from a plurality of vias, wherein each via is coupled to a bump (36), and wherein each bump is directly below a corresponding via (fig. 3, col. 3, lines 10-25) [claim 16].

Moreover, Huemoeller discloses, referring to figures 2A-3, a process comprising: forming a first via (23) in a wire-bonding mounting substrate, wherein the wire-bonding

Art Unit: 2841

mounting substrate includes a first surface and a second surface, and wherein forming proceeds from the second surface toward the first surface; and patterning a first wire-bond pad (22A) directly over the first via [claim 17] wherein forming ceases upon contact with the first wire-bond pad [claim 18], further including forming a via liner (22) in the first via [claim 19], further including: filling the first via with an interconnect (fig. 2B) [claim 20], wherein forming the first via precedes patterning the first wire-bond pad (fig. 2A-2E) [claim 21], further including: filling the first via with an interconnect; coupling the first via to a first bump (36) [claim 22], further including: coupling the first wire-bond pad to a first bump (36) [claim 23].

Furthermore Huemoeller discloses, a method comprising: forming a first via in a wire-bonding mounting substrate (20), wherein the wire-bonding mounting substrate includes a first surface and a second surface, and wherein forming proceeds from the second surface toward the first surface, patterning a first wire-bond pad (22A) directly over the first via; and coupling a die (31) to the first wire-bond pad [claim 24], further including: forming a second via in the wire-bonding mounting substrate (col. 3, lines 10-25); patterning a second wire-bond pad directly over the second via; and coupling the die to the second wire-bond pad (col. 3, lines 10-25) [claim 25], further including: filling the first via with an interconnect [claim 26], further including: filling the first via with an interconnect; and coupling the first via to a first bump (36) [claim 27].

Similarly, Huemoeller discloses, a computing system comprising: a wire-bonding mounting substrate (20) including a first surface and a second surface; a first wire-bond pad (22A) disposed upon the first surface; a first via (23A) in the wire-bonding mounting

Art Unit: 2841

substrate, wherein the first via is in electrical contact with the first wire-bond pad, and wherein the first via is disposed directly below the first wire-bond pad; a die (31) disposed on the first surface; at least one of an input device and an output device (31) coupled to first wire-bond pad [claim 28].

Claims 8, 10, and 28-30 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,812,580 (hereafter Wenzel).

Wenzel discloses, referring to figure 2, a package comprising: a wire-bonding mounting substrate (11) including a first surface and a second surface; a first wire-bond pad (22) disposed upon the first surface; a first via (72) in the wire-bonding mounting substrate, wherein the first via is in electrical contact with the first wire-bond pad, and wherein the first via is disposed directly below the first wire-bond pad; a die (12) disposed on the first surface and a first wire bond (60) that couples the die to the first wire-bond pad [claim 8], further including: a second wire-bond pad (14) disposed upon the first surface; a second via (70) in the wire-bonding mounting substrate, wherein the second via is in electrical contact with the second wire-bond pad, and wherein the second via is disposed directly below the second wire-bond pad; a second bond wire (61) that couples the die to the second wire-bond pad; and wherein the respective lengths of the first bond wire and the second bond wire are adjusted so as to tune the package (col. 2, lines 1-25) [claim 10].

Additionally, Wenzel discloses, a computing system comprising: a wire-bonding mounting substrate (11) including a first surface and a second surface; a first wire-bond

Art Unit: 2841

pad (22) disposed upon the first surface; a first via (72) in the wire-bonding mounting substrate, wherein the first via is in electrical contact with the first wire-bond pad, and wherein the first via is disposed directly below the first wire-bond pad; a die (12) disposed on the first surface; at least one of an input device and an output device (12) coupled to first wire-bond pad [claim 28], wherein the computing system is disposed in one of a computer, a. wireless communicator, a hand-held device, an automobile, a locomotive, an aircraft, a watercraft, and a spacecraft (col. 13, lines 1-5) [claim 29], wherein the die is selected from a data storage device, a digital signal processor, a micro controller, an application specific integrated circuit, and a microprocessor (col. 13, lines 1-5) [claim 30].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huemoeller in view of US 2003/0147227 (hereafter Egitto).

Huemoeller discloses the claimed invention as described above except Huemoeller does not specifically state that the first bump (36) is coupled to the first via (23); and a larger substrate coupled to the first bump. However it is well known in the art to attach a semiconductor device to a larger substrate as evidenced by Egitto (figure 1). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to couple the bump in the invention of Huemoeller to a larger substrate as is well known in the art and evidenced by Huemoeller. The motivation for doing so would have been to allow for the sharing of signals between several devices.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents disclose wire bonding substrates:

US 20004/0004278 Cheng et al.,


US 2004/0124545 Wang..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy C. Norris whose telephone number is 571-272-1932. The examiner can normally be reached on Monday - Friday, 9:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCSN



KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800